

Generalities:

TSAR is made up of several SAS macro routines that users can call which operate on time series store in TSAR format. The macros are called from a user-written driver SAS program to perform desired functions on/with those time series. Each macro requires an input parameter file which has a unique format which provides direction to the macro to indicate the series and/or type of operation to perform. Below is a list of the TSAR macros with a basic description of what it does, followed by an example parameter file.

Macro: update (defined in update.sas)

Description: Add/Modifies data in a time series. Once a time series is initially created, all raw updates to time series should be done through this routine.

Example:

```
bps
freq 12
utnmlumu        200002 6069                                V
utmm1umu        200002 12892                               V
utsm1umu        200002 36970                               V
utwm1umu        200002 18258                               V
```

This example will update four times series containing monthly data for the survey bps. Each parameter record has stat period 200002, but the file may contain multiple stat periods. If a time series already has data for stat period 200002, this data will replace it. If it does not, this new stat period will be added to the time series. The four series that would be updated by running this parameter file are: utnmlumu, utmm1umu, utsm1umu, and utwm1umu.

Macro: math (defined in math.sas)

Description: Performs mathematical operations to modify an existing series or to create an entirely new series.

Example:

```
SPAN 1 END END
UTNETOMU = UTNE1UMU + UTNE2UMU + UTNE34MU + UTNE5PMU;
XTNE1UMU = ROUND(UTNE1UMU/(FTNE1UMU/100));
```

First this example sets one span of operation which is to the end points of the time series. The user may specify up to three spans. Spans are defined as related to the START and END points of the time series. Another examples of a span would be: SPAN 1 END-11 END, which would operate on the last 12 data points of a series and SPAN 1 START END, which would operate on all the data points in a series. In the example above, if the time series UTMETOMU or XTNE1UMU already existed it the end point of the existing series would be updated. If they did not exist, they would be created with one data point. The end point value in UTMETOMU would be set to the sum of the end points from UTNE1UMU, UTNE2UMU, UTNE34MU, and UTNE5PMU. Also the end point value in XTNE1UMU would be set to UTNE1UMU/(FTNE1UMU/100) rounded to the nearest integer. It is the users responsibility to make sure that when doing these operations are meaningful. Dates of operation between the time series must exist on all time series for this to be meaningful. Also these directives are SAS statements and must end with a semi-colon. Any SAS mathematical function can be used.

Macro: x12 (defined in run_x12.sas)

Description: Runs the X-12-ARIMA seasonal adjustment program from SRD. Before this can actually run, the macro must convert the SAS time series to ASCII files. After seasonal adjustment, this macro then can take outputs from the X-12-ARIMA program and create new time series.

Example:

```
XTNE1UMU 1 d16=STNE1UMU
XTMW1UMU 1 d16=STMW1UMU
XTSO1UMU 1 d16=STSO1UMU
XTWE1UMU 1 d16=STWE1UMU
```

This parameter file will result in the X-12-ARIMA program being run on four series: xtne1umu, xtmw1umu, xtso1umu, and xtwe1umu. The X-12-ARIMA spc files for these series are expected to reside in the x12/x12specs directory for the survey. The D16 tables from the run are stored in the indicated new time series (e.g. the D16 results from xtne1umu processing are stored in time series stne1umu).

Macro: zero (defined in zero_out.sas)

Description: Will search time series for negative values and replace them with zero.

Example:

```
UTNE1UMU
UTMW1UMU
UTSO1UMU
UTWE1UMU
```

These four series will be read and if any negative values are found, they will be replaced by zero.

Macro: clr_work (defined in clr_work.mac)

Description: Cleans up the SAS work library. This does not require a parameter file. All data sets in the SAS work library are deleted.

Macro: drv_rake (defined in drv_rake.sas)

Description: Performs a one-way rake of several specified series to one other specified series.

Example:

```
SPAN 1 END END
RAKE(DTUSTOMU,DTNETOMU,DTMWTOMU,DTSOTOMU,DTWETOMU);
```

This parameter file uses a span just like the math parameter file and is defined in the same way. In this example, the end points of series dtnetomu, dtmwtomu, dtsotomu, and dtwetomu are ratio-adjusted to sum to dtustomu.

Macro: drv_summ (defined in drv_summ.sas)

Description: Sums data within a series to create a new series. This is used to create a quarterly or annual series from a monthly series, or an annual series from a quarterly survey. It can also create a year-to-date series from a monthly series.

Example:

```
span 1 end-23 end
summate amdmsv amdmsvd 7 4
summate amdmsv amdmsvs 1 2
```

The span here is the same as the span for the math parameter file but only one span period is allowed. This will create a new time series from series amdmsv. The amdmsvd series will have year-to-date estimates for the past 24 months of data (with 24 data points), and the amdmsvs will

contain quarterly estimates (with 7 or 8 data points).

Macro: drv_prnt (defined in drv_prnt.sas)

Description: Displays time series data into a printed report. There are several different print formats available: pr_d3lev, pr_dclev, pr_dump, pr_level, pr_mtm, pr_mtm1, pr_pctch, pr_ratio, pr_tabs, pr_tbase, pr_yrprf, pr_yrprs, and pr_yty.

Example:

```
PR_LEVEL STCN1UMU START END
PR_MTM   STCN1UMU START END
PR_YTY   STCN1UMU START END
```

This example will create four outputs based upon series stcn1umu using all data points in the series. The pr_level display is the data itself as stored in the time series; pr_mtm will show month-to-month changes, and pr_yty will show year-to-year changes.

Macro: pr_bea (defined in print_bea.sas)

Description: Creates an ASCII file from a time series in a format for transfer to BEA

Example:

```
12
LMFMM
LMFMM
LMFMFI
LMDMM
```

This example will create four ASCII files: one for each of the four specified series. The 12 indicates this is monthly data.

Macro: trend (defined in trend.sas)

Description: Creates an analytic report which includes unadjusted and seasonally adjusted data for the past year with month-to-month and year-to-year changes. This requires a special user-written SAS program to set up the parameters to correlate series names with data types.

Macro: drv_grph (defined in drv_grph.sas)

Description: Uses SAS/Graph to create a file of graph commands which can then be used to print a graph.

Example:

```
t0bz5005
t0bz5006
t0bz5008
```

This example will create three files of graph commands, one for each of the three series.

Macro: bmark (defined in drv_bmark.sas)

Description: Performs benchmarking using SRD's benchmarking program. Like the x12 macro, this must first format the data in ASCII files prior to running the benchmarking program. Afterward the benchmarked data is then loaded into new time series.

Example:

```
U20AVS U20ABM bmark1 -tfib
```

This example will run the benchmarking program on series u20avs using options tfib and create a

benchmarked series called u20abm. The .spc files for benchmarking must reside in the benchmark/benchspecs directory for the survey.